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WOOD ANATOMY OF THE NEOTROPICAL SAPOTACEAE XXXIII
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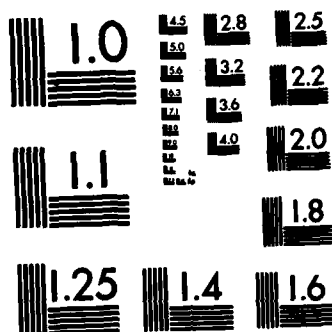
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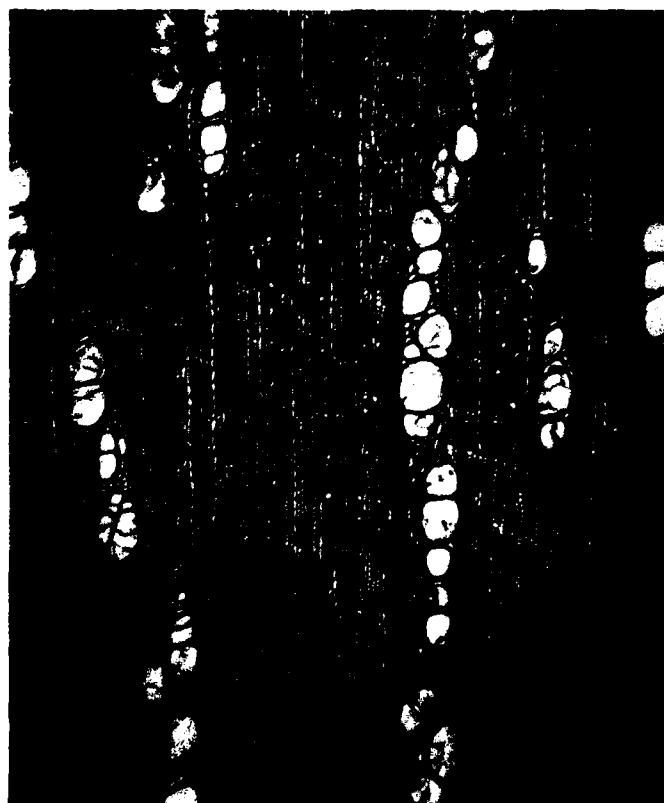
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**WOOD ANATOMY
OF THE
NEOTROPICAL SAPOTACEAE
XXXIII. ENGLERELLA**

RESEARCH PAPER FPL 421

FOREST PRODUCTS LABORATORY
FOREST SERVICE
U.S. DEPARTMENT OF AGRICULTURE
MADISON, WIS.

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Abstract

Adolfo Ducke adopted the name Englerella speciosa for a species he had described earlier as Lucuma speciosa Ducke. Aubréville and Baehni both referred this species to Richardella. The physical appearance, weight, and wood anatomy of this species is very different from that of typical Richardella and is regarded as a typical Englerella. To this have been added five species previously referred to Richardella and one Pouteria. This segregate group is readily separated from Richardella and is characterized by its light color, light weight, banded parenchyma, pores in laterally spaced radial files, and silica in the wood rays.

Preface

The Sapotaceae form an important part of the ecosystem in the neotropics; for example, limited inventories made in the Amazon Basin indicate that this family makes up about 25 percent of the standing timber volume there. This would represent an astronomical volume of timber but at present only a very small fraction is being utilized. Obviously, better information would help utilization--especially if that information can result in clear identification of species.

The Sapotaceae represent a well-marked and natural family but the homogeneous nature of their floral characters makes generic identification extremely difficult. This in turn is responsible for the extensive synonymy. Unfortunately, species continue to be named on the basis of flowering or fruiting material alone and this continues to add to the already confused state of affairs.

This paper on Englerella is the thirty-third in a series describing the anatomy of the secondary xylem of the neotropical Sapotaceae. The earlier papers, all by the same author and under the same general heading, include:

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| I. Bumelia--Res. Pap. FPL 325 | XVII. Gambeya--Res. Pap. FPL 361 |
| II. Mastichodendron--Res. Pap. FPL 326 | XVIII. Gomphiluma--Res. Pap. FPL 362 |
| III. Dipholis--Res. Pap. FPL 327 | XIX. Chromolucuma--Res. Pap. FPL 363 |
| IV. Achrouteria--Res. Pap. FPL 328 | XX. Manilkara--Res. Pap. FPL 371 |
| V. Calocarpum--Res. Pap. FPL 329 | XXI. Barylucuma--Res. Pap. FPL 372 |
| VI. Chloroluma--Res. Pap. FPL 330 | XXII. Pradosia--Res. Pap. FPL 373 |
| VII. Chrysophyllum--Res. Pap. FPL 331 | XXIII. Gayella--Res. Pap. FPL 374 |
| VIII. Diploon--Res. Pap. FPL 349 | XXIV. Ecclinusa--Res. Pap. FPL 395 |
| IX. Pseudoxythece--Res. Pap. FPL 350 | XXV. Ragala--Res. Pap. FPL 396 |
| X. Micropholis--Res. Pap. FPL 351 | XXVI. Myrtiluma--Res. Pap. FPL 397 |
| XI. Priurella--Res. Pap. FPL 352 | XXVII. Sarcaulis--Res. Pap. FPL 398 |
| XII. Neoxythece--Res. Pap. FPL 353 | XXVIII. Labatia--Res. Pap. FPL 416 |
| XIII. Podoluma--Res. Pap. FPL 354 | XXIX. Eglerodendron--Res. Pap. FPL 417 |
| XIV. Elaeoluma--Res. Pap. FPL 358 | XXX. Pseudocladia--Res. Pap. FPL 418 |
| XV. Sandwithiodoxa--Res. Pap. FPL 359 | XXXI. Pouteria--Res. Pap. FPL 419 |
| XVI. Paralabatia--Res. Pap. FPL 360 | XXXII. Richardella--Res. Pap. FPL 420 |

Publication in this manner will afford interested anatomists and taxonomists the time to make known their opinions and all such information is hereby solicited. At the termination of this series the data will be assembled into a comprehensive unit.

WOOD ANATOMY OF THE NEOTROPICAL SAPOTACEAE

XXXIII. ENGLERELLA

By

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Introduction

The genus Englerella was created by Pierre in 1891 consisting of the single species E. macrocarpa. Apparently the genus had been poorly described and remained static for some three decades until 1922 when Ducke adopted the name for his previously described Lucuma speciosa making the new combination Englerella speciosa Ducke. In 1964 Aubréville noted that Englerella was a synonym of Labatia Sw. and in 1965 Baehni (5)^{3/} placed the original species of Pierre in his group "genera of uncertain status." Aubréville (1) made the new combination Richardella speciosa (Ducke) Aubréville in 1961 and Baehni (5) made the same new combination Richardella speciosa (Ducke) Baehni in 1965. For anatomical purposes, Englerella speciosa Ducke and its allies is herein segregated because of the great difference between this group and certain species referred to Richardella by both Aubréville and Baehni. The Englerella group is readily separable from Richardella by its physical appearance and anatomical structure based only on hand lens examination (see paper XXXII Richardella in this series). Anatomically, the Englerella group consists of Englerella speciosa Ducke, Richardella amapaensis Pires, Richardella buenaventurensis Aubr., Richardella chochoensis Aubr., Pouteria espinac (Standl.) Baehni, Richardella lucuma (Ruiz and Pavon) Aubr., and Richardella surumuensis (Baehni) Aubr. plus a number of unassigned specimens from Brazil, Colombia, Ecuador, Peru, and Venezuela.

^{1/} Pioneer Research Unit, Forest Products Laboratory.

^{2/} Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

^{3/} Underlined numbers in parentheses refer to literature cited at the end of this report.

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Description

This description is based on 23 specimens; 12 are from named specimens and 11 were received simply as Sapotaceae (table 1).

General: Wood pale creamy yellow to off-white and frequently darkened by blue-stain fungus. Specific gravity of individual specimens ranges from 0.50 to 0.80 with an overall average of 0.66, well below the family average of 0.87. Wood without luster. Bark smooth, up to 2.5 cm thick.

Anatomical:

Pores arranged in laterally spaced files (figs. 1,4); solitary pores present but most commonly in radial multiples of 2 to 5 and infrequently longer, up to 10 pores. Maximum tangential diameter of individual specimens ranges from 87 μm in lucuma to a maximum of 236 μm in speciosa, with an overall average of 139 μm .

Vessel member length average 845 μm for the 23 specimens studied with a range of 680 μm to 1,060 μm for the individual specimens. Intervessel pitting 6 μm or 6 to 8 μm in diameter. Tyloses, when present, thin-walled. Perforation plates predominantly simple but a few scalariform plates with 1 to 5 bars were observed in macerated material of buenaventurensis and speciosa.

Axial parenchyma uniformly banded; the individual bands 1 to 2(3) seriate (fig. 2); usually distinct with a hand lens but usually less distinct in specimens of low specific gravity because of the low contrast between the wood fibers and parenchyma. Cells usually without brown contents, silica, or crystals.

Wood rays heterocellular: 1 to 3 seriate in most specimens but up to 4 seriate in speciosa (fig. 3). Cells with brown contents common or may be almost lacking as in buenaventurensis. Silica sparse to abundant in the tabular cells; spheroidal in most specimens but of the "clinker" type in buenaventurensis. Vessel-ray pitting irregular, obovoid to linear. Lateral walls of erect marginals and square with fine and abundant pits. Rhombic and microcrystals lacking. Maximum body height of multiseriate rays ranges from 197 μm to 810 μm ; averaging 731 μm in speciosa.

Wood fibers with thin to medium-thick walls; pitting fine and abundant. Fiber length of the individual specimens ranges from 1.31 mm to 2.21 mm with an overall average of 1.54 mm. Vascular tracheids sparse.

Silica content of the 16 specimens chemically analyzed ranged from 0.03 percent to 0.62 percent with an overall average of 0.23 percent.

Diagnostic features: Wood light-colored and "light" weight from an American member of the Sapotaceae. Pores arranged in laterally spaced radial filed; wood rays with silica. Similar appearing American Sapotaceae are: Gambeya which has reticulate parenchyma and microcrystals in the parenchyma and wood rays; Micropholis ulei which has crystal strands; and Achrouteria durifructa which has no contents of any type in the parenchyma and wood rays.

Notes

1. Richardella amapaensis Pires showed no evidence of silica under the microscope, and this has been attributed to the close proximity of wood specimen to the bark.
2. Richardella buenaventurensis Aubr. (2) was described from Pacific Colombia on the basis of leaves and fruits.
3. Richardella chocoensis Aubr. was described by Aubréville (2) from Pacific Colombia on the basis of leaves and flowers (Cuatrecasas 21097). A wood specimen from the type tree was available for this study.
4. Lucuma espinæ Standley (6) was described from Santa Marta, Colombia, based on Espina and Giacometto A 168. Baehni (3) made the new combination Pouteria ? espinæ (Standley) Baehni but placed it in his group "species of uncertain status." Aubréville made no mention of this species, and on the basis of the wood anatomy the author has placed it in the Englerella group.
5. Richardella lucuma (Ruiz and Pavon) Aubr. was originally received as Pouteria lucuma (Ruiz and Pavon) O. Ktze. and consisted of a small branch 2.5 cm in diameter. It is represented by Ll. Williams 189 which is cited in Flora of Peru (5). The small pores in this specimen (87 μ m) are attributable to the juvenile nature of the specimen.
6. Richardella speciosa (Ducke) Aubr. was first described by Ducke as Lucuma speciosa in 1919; but shortly thereafter, in 1922, he transferred this species to Englerella speciosa Ducke. Because the anatomy of this species is so different from the species cited initially by both Aubréville and Baehni, Englerella has been adopted here as the typical member of this group. This species is well documented from the many collections made from the living tree (No. 727) growing on the grounds of Museu Goeldi, Belem, Brazil.
7. Richardella surumuensis (Baehni) Aubr. was originally described as Pouteria surumuensis Baehni (3).

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1942. Mémoires sur les Sapotacées. II. Le genre Pouteria.
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5. Baehni, Charles and Luciano Bernardi.
1970. Flora of Peru (Sapotaceae). *Field Mus. Nat. Hist.* XIII:
Part V-A, No. 3:135-177.
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1932. Three new trees from Colombia. *Trop. Woods* 32:21.

Table 1.--Selected measurements of specimens examined--Englerella^{1/}

| Species | Collector and number | Sp.gr. | Si | MPD | VML | FL | IV | R | MBH | Source |
|-------------------------|------------------------|--------|------|---------------|---------------|------|---------------|---|---------------|-----------|
| | | | % | μm | μm | mm | μm | | μm | |
| <u>amapaensis</u> | Rosa, N.A. 1837 | | | 134 | 1,060 | 2.21 | 6 | 3 | 710 | Brazil |
| <u>buenaventurensis</u> | Cuatrecasas 15719 | 0.69 | 0.27 | 150 | 780 | 1.32 | 6 | 3 | 433 | Colombia |
| | Cuatrecasas 16276 | 0.76 | 0.17 | 134 | 850 | 1.47 | 6 | 3 | 473 | Colombia |
| | Cuatrecasas 16594 | 0.63 | 0.34 | 142 | 910 | 1.45 | 6 | 3 | 552 | Colombia |
| | Cuatrecasas 19945 | 0.70 | 0.08 | 134 | 850 | 1.40 | 6 | 2 | 450 | Colombia |
| <u>chocoensis</u> | Cuatrecasas 21097 | 0.62 | 0.10 | 173 | 880 | 1.66 | 6 | 2 | 276 | Colombia |
| <u>espinae</u> | Espina-Giacometto 168A | 0.73 | 0.05 | 118 | 990 | 1.66 | 6-8 | 3 | 315 | Colombia |
| <u>lucuma</u> | Williams, Ll. 189 | 0.80 | 0.48 | 87 | 810 | 1.60 | 6-8 | 2 | 473 | Peru |
| <u>speciosa</u> | For. Dept. 3162 | 0.50 | 0.25 | 165 | 840 | 1.84 | 6 | 3 | 790 | Guyana |
| | Museu Goeldi tree 727 | 0.60 | 0.14 | 197 | 680 | 1.36 | 6 | 4 | 615 | Brazil |
| | Silva, N.T. 4752 | | | 236 | 810 | 1.58 | 6 | 4 | 789 | Brazil |
| <u>surumuensis</u> | Maguire et al. 28363 | 0.88 | 0.03 | 110 | 780 | 1.54 | 6 | 2 | 236 | Venezuela |
| UNASSIGNED SPECIMENS | | | | | | | | | | |
| | Cuatrecasas 19187 | 0.76 | | 118 | 700 | 1.44 | 6-8 | 2 | 315 | Colombia |
| | Cuatrecasas 22250 | 0.58 | 0.42 | 189 | 750 | 1.35 | 6-8 | 4 | 810 | Colombia |
| | Espina-Giacometto 167A | 0.67 | 0.06 | 150 | 760 | 1.31 | 6-8 | 2 | 291 | Colombia |
| | Espina-Giacometto 199A | 0.67 | 0.07 | 118 | 990 | 1.73 | 6-8 | 2 | 236 | Colombia |
| | Monteiro, O.P. 852 | 0.65 | | 197 | 860 | 1.66 | 6-8 | 3 | 528 | Brazil |
| | Ortega 44 | 0.50 | | 150 | 860 | 1.54 | 6 | 3 | 552 | Ecuador |
| | Ortega 47 | 0.50 | | 126 | 1,020 | 1.60 | 6 | 2 | 315 | Ecuador |
| | Ortega 216 | 0.50 | | 95 | 920 | 1.53 | 6 | 2 | 394 | Ecuador |
| | Pittier 372 | 0.78 | 0.31 | 118 | 830 | 1.53 | 6-8 | 2 | 197 | Venezuela |
| | Prance 12654 | 0.69 | 0.62 | 134 | 730 | 1.25 | 6-8 | 4 | 613 | Brazil |
| | Trade specimen | 0.78 | 0.35 | 165 | 790 | 1.39 | 6-8 | 2 | 434 | Peru |

^{1/} Sp. gr. = specific gravity; Si = silica content; MPD = maximum tangential pore diameter; VML = vessel member length; FL = fiber length; IV = intervessel pit diameter; R = maximum ray seriation; and MBH = maximum body height of multiseriate portion of wood rays. Silica analysis by Martin F. Wesolowski, Chemist, FPL.

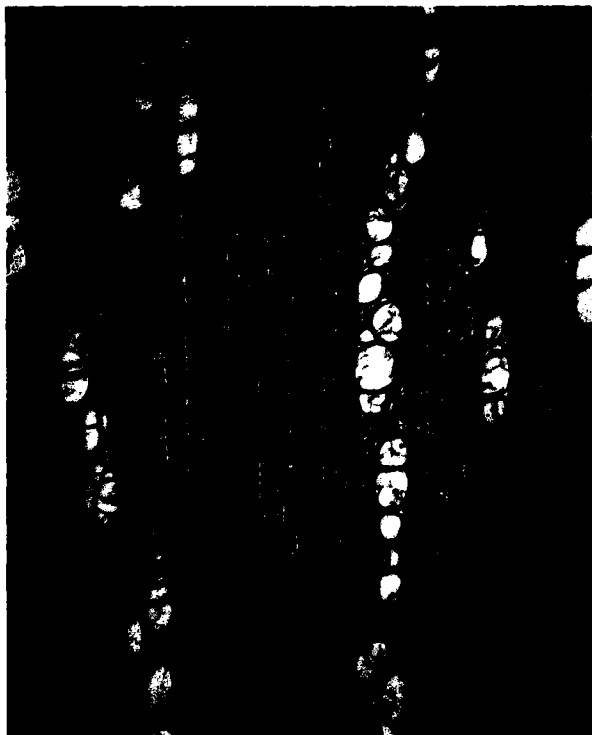


Figure 1.--Englerella speciosa,
topography of transverse section
X 30 (Museu Goeldi tree No. 727).



Figure 2.--Same as figure 1, showing
parenchyma detail X 110
(N. T. Silva 4752).



Figure 3.--Same as figure 1, tangential
section X 110
(Museu Goldi tree No. 727).

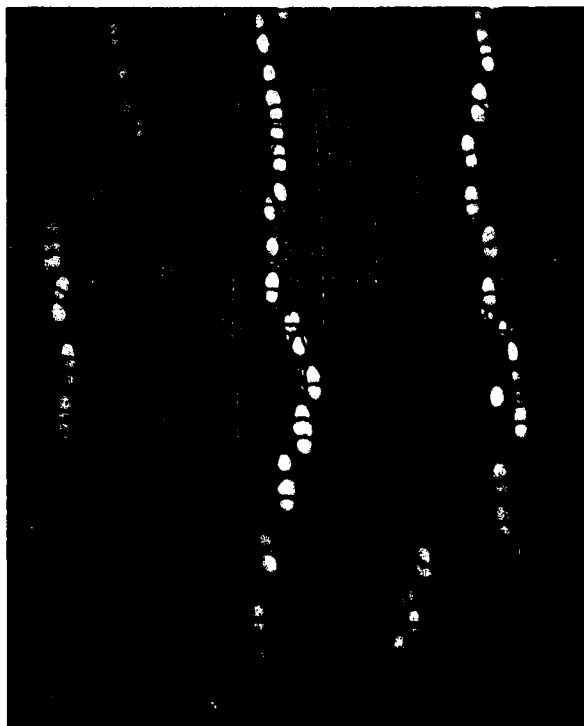


Figure 4. Englerella buenaventurensis,
topography of transverse section X 30
(Cuatrecasas 16594).

U.S. Forest Products Laboratory

Wood anatomy of the neotropical Sapotaceae: XXXIII.
Englerella, by B. F. Kukachka, FPL.

6 p. (USDA For. Serv. Res. Pap. FPL 421).

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